

OUR WATER AGAIN.

LISTEN TO THE OTHER SIDE.

Superintendent Bolling Replies to the Doctors' Indictment of Richmond's Drinking Water—Facts and Figures.

Nothing of recent date has excited more interest among the people of Richmond than the publication by THE TIMES last Sunday of its article on the water we drink.

The purpose of THE TIMES was to bring this question before the public and to promote the discussion of a subject so vital to the welfare of the city.

No doubt there are reasons why this disagreeable subject would be cheerfully ignored by the City Fathers, at least for a season, and until the manure of the city's cash is completed. But there was a feeling among our people of great anxiety on the ever present water question, and it was growing. The Times knew this, and determined at once to bring the matter before the public.

The result has been what might have been expected for the morning is laid before the people a reply from Mr. Charles E. Bolling, the Superintendent of the City Water Works, in which he gives the city's side of the case with ability and frankness. He further suggests—as he says in his concluding paragraph—that the city should improve the purity of our water supply.

His statements, though dealing with scientific details, will be read with great interest.

OFFICE OF CITY WATER WORKS,
912 EAST BROAD STREET,
RICHMOND, VA., August 4, 1892.

To the Editor of THE TIMES:

There appeared an article in THE TIMES of Sunday, July 26, headed "We Drink," which demands some notice from this department. After publishing the report made to the Chamber of Commerce December 21, 1891, by a committee of the Medical Society, composed of Drs. H. M. Taylor, C. R. Tompkins, Charles M. Shields and Benjamin Harrison, I contained certain statements from Dr. Hunter McGuire wherein he pronounced our drinking water unwholesome and unfit to drink, and recommendations by the said committee, Dr. McGuire and Mr. Williams, to the effect, that we take our water from the New pump-house instead of from the forebay at the pump-house.

The article referred to reflects most seriously upon the officers of this department. The committee on water, the Board of Health and the city council have had charge of this matter for the last ten years (for such has been the length of time since our new pumps were put in operation), who sat in a state of idleness and lethargy, with no interest or care in the matter, allowed this thing to go on, and it remains for a committee of the Medical Society, composed of Drs. Hugh M. Taylor, Christopher Tompkins, Charles M. Shields and Benjamin Harrison to make a personal examination of the water, and the people of Richmond have been drinking the contaminated and polluted water of the canal for years, and it would seem that such a state of things had been allowed to go on all this time with no thought or care on the part of the authorities, and the people of the city. Suppose we look at some of the facts in the case as opposed to the theories which have been given out.

In the summer of 1884 the Committee on Water made an inspection of the canal from the pump-house to Boshers' dam and discovered that the water flowing from the river above Boshers' dam to the canal and that from each stream emptying into the canal above the pump-house should be both measured and analyzed. At that time the water coming from the river into the canal was much less in volume than it is now. Careful measurements of the volumes were made by the City Engineer and analyses by Dr. William H. Taylor, State chemist. It was shown by the analysis of Dr. William H. Taylor that the water in the forebay at the pump-house, which had received all the flow of the tributary streams along the canal, was better than it was in the river above Boshers' dam, due to the settling and aeration it gets along the route between the dam and pump-house, and the sample taken from the hydrant (owing to the settling in the reservoir) was better than the rest. Furthermore it was shown that the much-talked-of and condemned water of Tuckahoe creek was even better than Croton water, which New York city has spent millions of dollars to procure. It should be observed just here that at this time we are taking from the river above Boshers' dam 261,308 gallons per minute, and from all the streams combined and tributary to the canal 7,772 gallons per minute. In the canal a slow-flowing and stagnant stream, but it has a velocity of one mile and a half per hour, and it takes just five hours for the water entering the feeder from the river to reach the pumps. The chances of contamination of each of the small streams flowing into the canal was looked into. With the exception of Tuckahoe creek, the areas drained by the smaller streams were small, the ground occupied in a very limited manner, few dwelling-houses, and occupants, and they in most instances considerably removed from the banks of the streams. The entire north bank of the canal from the pump-house for four miles west is sparsely populated and the water, when a small one. The dividing ridge varies from a quarter of a mile to a mile north of the canal, and nearly all the farm drainage goes northwardly into the Chickahominy river. For a considerable distance along the canal the land is well covered with woods, and is not under cultivation. All of this was under consideration and examination for weeks.

Last September the afore-mentioned committee, accompanied by Colonel Cutshaw, City Engineer, myself and others, took a tender by the Chesapeake and Ohio railway and ran over our own canal, and back in Richmond in four hours. We got out and looked at Tuckahoe creek where it passes under the railroad, four miles above the dam, and again looked at it where it joined the feeder. No one at the station, channel and banks was made to learn what evils it bore, nor in what manner it acted as a sewer. The waters of none of the little streams were sampled or tested, and I may say just here that all of the streams except Tuckahoe creek find their way into the pump springs but a short distance from their final discharge into the canal. It took just four hours for the medical committee to condemn these streams.

Now we come to the question of the polluted sewage taken into the canal at what is called the Philadelphia quarry. There are about seventy-five or one hundred laborers here who are day laborers and who live in and near Richmond; they and their families do not reside at the quarry. There are specially provided privies for the use of the workmen, and notices are posted around that these privies alone must be used; they are not connected with and do not discharge their contents into the little canal which finds its way into the canal. By act of the Legislature, the city has the absolute right to control and prevent the drainage of any fifth into the canal from which she gets her water supply. It will be seen, therefore, that this canal is in no sense a sewer, or no more so than the river proper is for the city and the villages along its shores above us. The report published in Sunday's Times, made by Drs. H. M. Taylor, Tompkins, Shields and Harrison, was laid before the Chamber of Commerce December 21, 1891, and the Chamber examined carefully into the report and had before this also the statements of Dr. William H. Taylor, Mr. Hugh Blair, Colonel Cutshaw and myself in regard to the healthfulness of our drinking water, and the Chamber laid the report about the water on the table and there it now. If the theories advanced by the committee had been true it is a most serious reflection upon the Chamber of Commerce, to Richmond's gentlemen who are ever alive to Richmond's health and welfare, that they should have tabled so important a matter as this, in which the health and lives of our citizens are at stake, and to have allowed this serious and important matter to be buried. The Chamber of Commerce, had the Chamber in the committee's report been established, would certainly have brought this important matter to the attention of the City Council and would have caused the recommendations made by the medical committee to be carried out. Let us examine into this recommendation, namely, that the water pipes supplying the pumps be extended out into the river

at or near the pump-house, and the water be pumped directly from the river, and this plan is recommended by both the aforesaid committee and Mr. H. D. Whitcomb in his letter to you. Mr. Whitcomb tells you that the pipes can be easily run into the feeder and the water taken there. The gates at the upper end of this feeder have to be kept closed now in order to prevent the water from flowing back from the canal into the river, the surface of the canal being higher than that of the river above the dam. Their latest plan is to carry out this plan the suction pipes would have to be extended to some point in the river above the feeder-gates and above Grant's dam. This is no difficult or expensive thing to do, but is the water in the river at this point better than that in the canal? Is it perfectly pure and unpolluted?

It should be observed that the committee of the Medical Society made no examination or report as to the chances of contamination of the river from any causes on the south bank. Their investigation was confined to the river to the north side, and they make their recommendation without having given this important question any consideration. The volume of water flowing down James river was carefully measured during the summer season some years ago, above Boshers' dam, and ascertained to be 1,800 cubic feet per second, and from certain reference points, such as the depth of water on the crest of Boshers' dam, it is about the same in the summer season, unless the season is a rainy one. We take from above Boshers' dam about 600 cubic feet of water per second into the canal, so that leaves 700 cubic feet to flow on down the river channel. Grant's dam, starting from the feeder gates, runs obliquely up the river towards the southern shore, joining on to certain ledges of rock and it touches the south bank.

This dam was so located as to lead the river over towards the feeder gates and supply the Richmond level of the canal with water and in low stages of the river the flow is directed towards the dam quite a bold stream—Powhite creek—joins the river, and a little distance up this stream is Granite, a large stone quarry, where there are 400 operators, a large number of them residents. All the sewage from this settlement is borne to the river. A few miles further up this stream is Bon Air, which also has, I am informed, a population of about 200 in summer time. The sewage from this place is also drained to the river.

About two miles above Grant's dam, on the south side of the river, is the Westham granite quarry, where there is again a settlement with a population of about 100 persons, some of whom are residents. All of the sewage and filth at this point is washed directly into the river. Here then, close to the pump-house, we have a population of about 500 persons and all the drainage from their homes finds its way into the river at points above where the intake chamber for our pumps would be situated according to the quoted recommendation, and the volume of water in the river with which this would be mingled but little greater than the river water in the canal. I should say that this population is at least four times greater than the resident population on the north side, and that the drainage from their homes is much nearer the pumps, if the pipe connection is made to the river. The main point is this: Is the water in the river better than that in the canal at this point? I think not.

I come now to Dr. McGuire's statement in THE TIMES article of the 31st. When asked the question, "What do I think about the drinking water at Richmond?" "I think it is utterly unfit to drink," he states that the report of the committee appointed by the Chamber of Commerce shows at different points the sewage and filth which comes into the canal. One would imagine from this that each stream flowing into the canal was laden with sewage. Such is not the case. Dr. H. N. Taylor found at Westham some little distance from the canal old pits from which the clay had been removed for making bricks. In one of these pits was found three dead rats and a dead fish and one would infer that every time it rained the entire contents of these stagnant pools were borne into the canal. Such is not the case. These pits are separated from the

Report of chemical examination for sanitary purposes of two samples of water from Richmond, Va., for Charles E. Bolling, Esq., Superintendent City Water Works, October 31, 1891.

Sample No. 1 was taken from a faucet in the office of City Water Works, Richmond, Va., October 22, 1891. Sample No. 2 is from Dr. Hunter McGuire's well at his residence on Brook road, taken and sealed by Colonel W. E. Cutshaw, City Engineer, October 21, 1891.

C. E. BOLLING, Superintendent.

Sample James River Water, No. 1. Sample Well Water, No. 2.

Clearness or turbidity..... Distinctly turbid Not quite clear, but not very much so.

Color in 2-foot tube..... Very light yellowish brown. Very light yellowish brown, fainter—almost colorless.

Odor and taste..... None. None.

Reaction to test paper..... Practically neutral—Slight, but decided very faint trace of acidity.

Parts per Million. Parts per Million. Parts per Million. Parts per Million.

Total solids in solution..... 88.4 5.167 98.2 15.374

Poisonous metals..... None. None. None. None.

Hardness..... None. None. None. None.

Chlorine..... 2.06 1.203 67.01 8.9200

Phosphates..... Trace too minute to have any special significance.

By Combustion Process.

Organic carbon..... 1.22 .0771 1.07 .0625

Organic nitrogen..... .12 .0133 .19 .0111

By Wanklyn-Nessler Process.

"Free" ammonia..... .009 .0075 .008 .0022

Nitrogen in nitrates..... None. None. .012 .007

Nitrogen of nitrates..... .024 .0014 11.581 .6648

By Kubel Permanganate Process.

Oxygen consumed..... 1.269 .0741 1.028 .0600

Dissolved Gases—Cubic centimeters per Liter

Carbon dioxide..... 4.27 .67 6.16 1.428

Nitrogen..... 10.48 2.421 10.23 2.363

Temperature of room..... 19°-20° 59°-61° do. do.

J. W. MALLET, University of Virginia.

Professor Mallet plainly says that No. 1 (James river water) seems to be of a very fair character, but the results for No. 2 (Dr. McGuire's well water) as to total solids, chlorine, free ammonia, and especially nitrates and nitrites, show this to be of a totally different nature and class among waters of a highly suspicious character.

Professor Mallet evidently expresses an opinion here based upon results obtained from chemical analysis alone.

If Dr. McGuire still prefers to drink water of a "highly suspicious character" I am sure neither I nor the public will object. Professor Mallet clearly does not mean to state that chemistry does not show whether water is healthy or fit to drink; he merely (I presume) means to say that chemical analysis does not destroy the germs of typhoid, cholera, &c.

An analysis and report was also made by Dr. William H. Taylor, State Chemist, October 19, 1891, which I give below. Dr. Taylor is a well-known and successful physician, most skilled in his profession. Dr. Taylor would not have made the following statement unless he was sure of the truth:

LABORATORY STATE ANALYST AND CHEMIST, 606 EAST GRACE STREET, RICHMOND, VA., October 19, 1891.

Superintendent Charles E. Bolling: Dear Sir,—The following are the results of my analysis of the sample of mine-water which you submitted to me for examination:

They are expressed in grains per gallon of 231 cubic inches.

canal by a solid clay bank, and some little distance from the canal, and the surface drains do not bear the whole stagnant contents into the canal, but only the overflow. Tompkins stated that there was an old ditch near the Philadelphia quarry in which dead horses and cows were thrown, and that the contents of the ditch finally found its way to the canal. There is no known instance when a horse fell in the ditch and was killed or fell and was thrown into the ditch, which was reported to me, and I had the horse buried in a field near by soon after it happened.

Not a single examination of the waters of these streams was made to ascertain whether they were filled with sewage and thoroughly polluted or whether they were pure.

The Council Committee on Water had had each one carefully examined and analyzed, and that report is on file in the Council chamber. Dr. McGuire says, "I found that the canal is a semi-stagnant stream for nine miles. The whole distance from the pump-house to the river above Boshers' dam along the canal is about seven miles, and the velocity of the current is about a mile and a half an hour, a quantity of water nearly one-half the river flow."

Can this be called a semi-stagnant stream? Dr. McGuire says: "I think it very probable that one case of diphtheria, a dairy farm on the Tuckahoe creek last fall caused the malignant epidemic of diphtheria that we had then." Dr. McGuire does not state whether this particular case of diphtheria happened prior to the epidemic that raged in Richmond or not. It would be well to know that fact.

The diphtheria was prevalent in Ashland, in the counties of Goochland, Chesterfield, Hanover, Albemarle and some others. Was the diphtheria which prevailed at these places also traceable to the drinking water of Richmond, all proceeding from the one source on the Tuckahoe creek? There are other statements which Dr. McGuire makes which properly belong to medical science, which I do not propose to discuss, but there is one, namely, a comparative analysis made by Professor Mallet of the University of Virginia last October of the hydrant water we drink and the well water from Dr. McGuire's home on the Brook road. The sample of well water was taken by Colonel Cutshaw, and Professor Mallet was in entire ignorance of what either of these waters were or where they came from. I herewith give Professor Mallet's analysis and his letter on the subject. In the article in Sunday's Times, Dr. McGuire asked Professor Mallet two questions.

1. "Can you tell from a chemical analysis of water only whether it is pure or not?"

2. "Can you tell from analysis of water whether it is infected with poisonous germs, such as those of diphtheria, typhoid fever, &c.?"

Professor Mallet's answer is given in full in Sunday's Times. The postscript to his letter was: "In cases of this kind, and my analysis sufficiently direct and categorical in answer to your questions I will simply say 'No' to each of them."

See Professor Mallet's report and letter October 31, 1891.

UNIVERSITY OF VIRGINIA, October 31, 1891.

Charles E. Bolling, Esq., Superintendent City Water Works, Richmond, Va.

Dear Sir,—By working a good deal at night I have pressed forward as much as possible the examination of the two samples of water sent me by you, and am now able to give you the results, as given in the report I herewith enclose. No. 1 seems to be of very fair character, but the results for No. 2 as to total solids, chlorine, free ammonia, and especially nitrates and nitrites, show this to be of a totally different nature, and class among waters of a highly suspicious character. I shall be glad to learn from you what is the history of each of these samples. I can then judge whether any of the determinations now reported on ought to be repeated on the spot without allowing time for the continuance of nitrification or other processes of change. I enclose my bill for the services rendered, which please have acted upon at your convenience. I shall be glad to know that this letter and its enclosure safely reach you.

I am, dear sir, very respectfully, your obedient servant, J. W. MALLET.

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